# RINGKASAN

Gula kelapa kristal merupakan produk olahan dari nira kelapa yang diproduksi pada skala rumah tangga maupun industri. Nira kelapa mudah mengalami kerusakan karena aktivitas mikroba. Kerusakan nira kelapa tersebut dapat dicegah dengan menggunakan beberapa bahan pengawet. Salah satunya adalah formula laru alami campuran bubuk kulit manggis dengan bubuk kapur. Selain penggunaan laru alami, pengawetan nira dapat juga dimaksimalkan dengan cara penyimpanan nira dengan suhu rendah. Penelitian ini bertujuan untuk 1) mengetahui pengaruh suhu penyimpanan nira terhadap karakteristik kimia dan sifat fisik gula kelapa kristal, 2) mengetahui pengaruh variasi proporsi kulit manggis terhadap karakteristik kimia dan sifat fisik gula kelapa kristal, 3) mengetahui pengaruh lama penyimpanan nira terhadap karakteristik kimia dan sifat fisik gula kelapa kristal, 4) menetapkan kombinasi perlakuan terbaik antara variasi suhu, proporsi serbuk kulit manggis dan lama penyimpanan nira agar menghasilkan gula kelapa kristal dengan sifat kimia dan fisik yang baik.

Penelitian ini dilakukan secara eksperimental dengan menggunakan *Split Plot Design* dengan Rancangan Acak Kelompok (RAK) sebagai rancangan dasar. Suhu Penyimpanan Nira (S) dialokasikan sebagai *Main Plot* yang terdiri dari suhu $2^0$C (*Refrigerator*) dan -$20^0$C (*Freezer*), sedangkan Konsentrasi serbuk kulit manggis (K) yang terdiri dari 0%b/v; 1%b/v; 2%b/v; 3%b/v dan laru kontrol serta Waktu Penyimpanan Nira (W) yang terdiri dari 0 hari, 4 hari dan 7 hari dialokasikan sebagai *Sub Plot.* Berdasarkan faktor yang digunakan, diperoleh 30 kombinasi perlakuan yang dilakukan dengan 2 kali ulangan sehingga diperoleh 60 unit percobaan. Parameter kimia yang diamati berupa kadar air, kadar gula reduksi, kadar gula total, kadar sukrosa, kadar abu dan bagian tidak larut air, serta parameter fisik berupa warna, khusus kombinasi perlakuan terbaik berdasarkan uji indeks efektifitas. Data variabel fisikokimia dianalisis dengan menggunakan Uji F pada taraf 5% dan apabila berbeda nyata akan dilanjutkan dengan Uji *Duncan's Multiple Range Test* (DMRT) pada taraf 5%.

Hasil penelitian menunjukkan bahwa penyimpanan nira pada suhu -$20^0$C (*Freezer*) dan penambahan serbuk kulit manggis 3% merupakan perlakuan terbaik yang mampu mempertahankan mutu nira bahan baku gula kelapa kristal selama penyimpanan. Kombinasi perlakuan terbaik pada gula kelapa kristal berdasarkan uji indeks efektifitas yaitu pada penyimpanan nira pada suhu -$20^0$C (*Freezer*) dengan konsentrasi serbuk kulit manggis 3% dan waktu penyimpanan selama 4 hari (S2K3W2) dengan karakteristik kimia dan fisik sebagai berikut: kadar air 5,66%bb, kadar gula reduksi 5,42%bk, kadar gula total 89,29%bk, kadar sukrosa 86,81%bk, kadar abu 1,45%bk, bagian tidak larut air 2,45%bk dan warna 32,5 L.

## *SUMMARY*

*Coconut crystals are processed products from coconut sap which is produced on a household or industrial scale. Coconut sap is easily damaged due to the microbes activity. The damage of coconut sap can be prevented by using several preservatives. One of which is a natural fermented palm sap formula of mangosteen skin and chalk powder mixture. Other than the use of natural fermented palm sap formula, the preservation of sap can also be maximized by storing sap in low temperature. This research aims to 1) know the effect of sap storing temperature on the chemical characteristics and physical properties of coconut crystals, 2) ) know the effect of variations in the proportion of mangosteen skin on the chemical characteristics and physical properties of coconut crystals, 3) know the effect of sap storing time on the chemical characteristics and physical properties of coconut crystals, 4) determine the best combination of treatments between the variation of temperature, the proportion of fermented palm sap and sap storing time to produce coconut crystals with good chemical characteristics and physical properties.*

*This research is carried out experimentally by using Split Plot Design with Randomized Group Design (RGD) as basic design. Sap Storing Temperature (S) is allocated as Main Plot which consists of a temperature of $2^0$C (Refrigerator) and -$20^0$C (Freezer), whereas Fermented Palm Sap Concentration which consists of 0%w/v; 1%w/v, 2%w/v; 3%w/v and the control fermented palm sap also Sap Storing Time (W) which consists of 0 day, 4 days, and 7 days allocated as Sub Plot. Based on the used factors, 30 combinaton of treatments which is conducted twice so 60 experimental units are obtained. The observed chemical parameters are in the form of water content, reducing sugar content, total sugar content, total sugar content, sucrose level, ash content and water-insoluble part, and the physical parameter in the form of color, specifically for the best combination of treatment based on the effectiveness index test. Physicochemical variable data is analyzed using F-Test at a level of 5% and if it's significantly different it will be continued with the Duncan's Multiple Range Test (DMRT) at a level of 5%.*

*The results of this research show that the storage of sap at -$20^0$C (Freezer) and the addition of 3% mangosteen skin powder is the best treatment that is able to maintain the sap quality as the raw material of coconut crystals during the storage. The combination of best treatment on coconut crystals based on the effectiveness index test is the storage of sap at -$20^0$C (Freezer) with the concentration of fermented palm sap of 3% mangosteen skin powder and storage time of 4 days (S2K3W2) with chemical characteristics and physical properties as follow: water content of 5,66%bb; reducing sugar content of 5,42%bk, total sugar content of 82,29%bk, sucrose level of 86,81%bk, ash content of 1,45%bk, water-insoluble part of 2,45%bk and color of 32,5 L.*